Control Room Shifts:
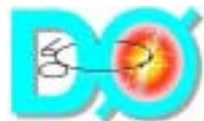## A Year In Review - *Alan L. Stone*

Why Do Control Room Shifts?

- **1900+ Shift Positions to fill each Quarter**
  - Distribute responsibility evenly among the collaboration
- **Steady improvement of Data Quality**
  - New energy & fresh perspectives
    - Improve online monitoring of data – More eyeballs
  - Understand detector performance & data taking
- **Increase the pool of experts**
  - Need to relieve/replace seasoned experts
- **Grand equalizer within the Collaboration**
  - 8 hour shifts - Punching a time clock like a real job!
  - Professors, Post-docs, Grad Students, even Spokes!

How Numbers Were Determined

- ## DØ Shift Calendar
  - 1 April 2001 – 31 March 2002
  - Quarterly Sums & Averages
- ## CR Shifts Counted
  - Shift Captain, DAQ Shifter
  - Detector Shifts: CAL, MUO, SMT, CFT, FPD
  - Software: SAM
    - 2 SAM Shifts = 1 CR Shift
  - Experts: DOC, LUM, L2, L3, CAL-Exp, SMT-Exp, CFT-Exp
    - 7 days On-Call = 1 CR Shift
- ## No Double Counting
  - Dual Shifts: CAP + Detector, DAQ + Detector
    - Gave 1 Shift Credit in the CAP or DAQ column

- ## Most Recent Author & Masthead Lists
  - Q2 2001: 23 MAR 2001
  - Q3 2001: 3 JUL 2001
  - Q4 2001: 7 SEP 2001
  - Q1 2002: 28 JAN 2002
- ## Institutional Averages based on the Number on Inst. Masthead
  - Assumed no exemptions
  - Presumed masthead was constant for quarter

# Sums & Averages: Individuals & Institutions

- ## Top 10 Shifters:

  - **Andrew Askew** *Rice* **64**
  - **Ryan Hooper** *Notre Dame* **54**
  - **Horst Wahl** *FSU* **52**
  - **Greg Davis** *Rochester* **49**
  - **Marco Verzocchi** *Maryland* **43**
  - **Harald Fox** *Northwestern* **42**
  - **Joe Steele** *Virginia* **43**
  - **Mike Tuts** *Columbia* **42**
  - **Mingcheng Gao** *Columbia* **41**
  - **Alan Stone** *LATech* **41**


  Sum = 471 Shifts = 8.7% Total!

- ## 5432 CR Shifts taken by 366 Shifters in past year
  - 14.84 Shifts/Person/year

- ## Average by Institution
  - 9.11 Shifts/Masthead/year

- ## Average by Consortium
  - 10.16 Shifts/Masthead/year

- ## More numbers by month & quarter, type of shift and DØ status - Some points to note:
  - 13 Institutions joined DØ only within the past year
  - Not all shift positions were filled throughout the year
  - Not all Shifters are on a Masthead
  - 17 Dual shifters – 131 "extra" shifts

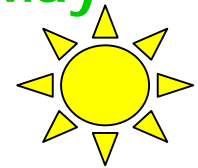**http://www-d0.fnal.gov/~alstone/d0_private/AllShifts.xls**
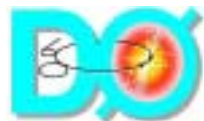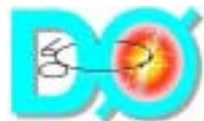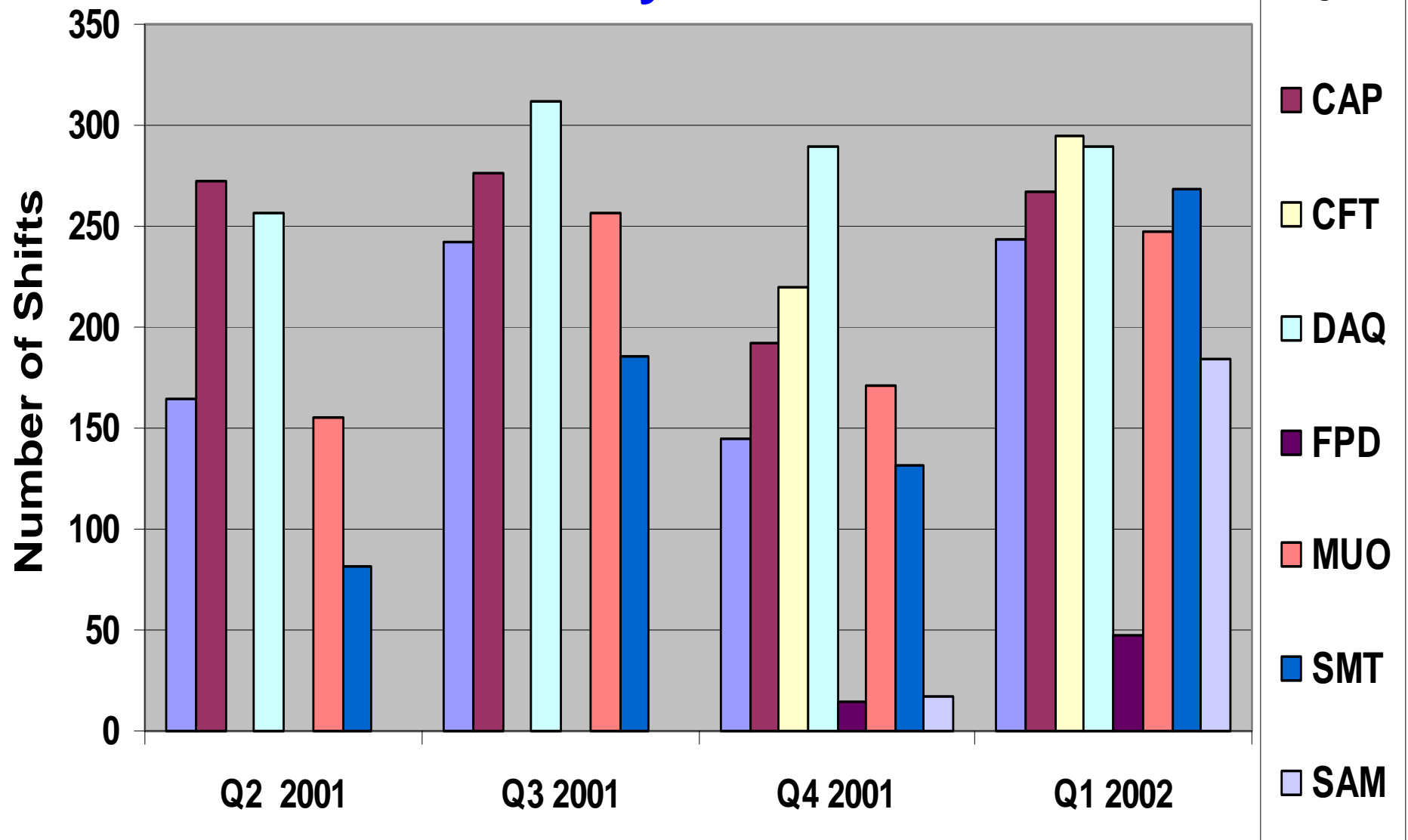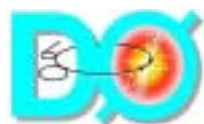
Shifts Sums & Averages
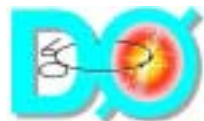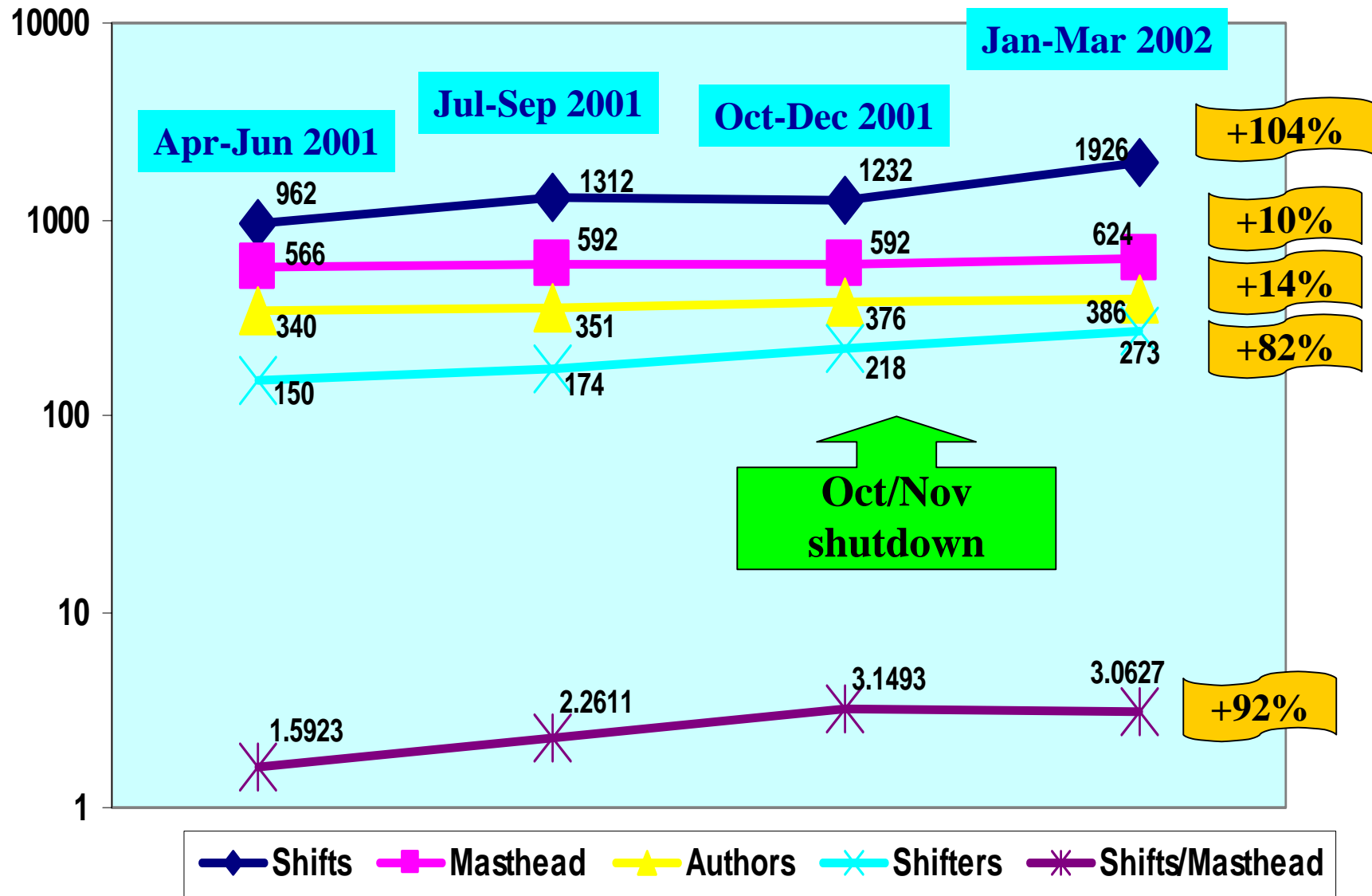
Good News: Steady Increase

- **More People on DØ Masthead**
  - Increased by 10% in past year
- **Increase of New Shifters Each Qtr**
  - $150 \rightarrow 174 \rightarrow 218 \rightarrow 273$
  - 11 New People signed up for April & 8 more for May
    - Including new to DØ & members since Run 1
      - Still many openings for May & throughout the summer!
- **Over 200 people took at least 10 shifts last year**
  - 100 DØ colleagues were on shift at least 20 times!
    - Sixteen were non-residents!
- **Great distribution of shifts in top 100**
    - 15 Profs, 32 Scientists, 19 Post-docs & 34 Grad Students
    - 40 Different Institutions!

Quarterly Shifts

Q1 2002 Shifts

1926 Shifts

Pie chart with the following segments:
- CAL: 244 (13%)
- CAP: 267 (14%)
- CFT: 295 (15%)
- DAQ: 289 (15%)
- FPD: 47 (2%)
- MUO: 248 (13%)
- SMT: 268 (14%)
- SAM: 184 (10%)
- EXP: 84 (4%)
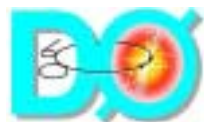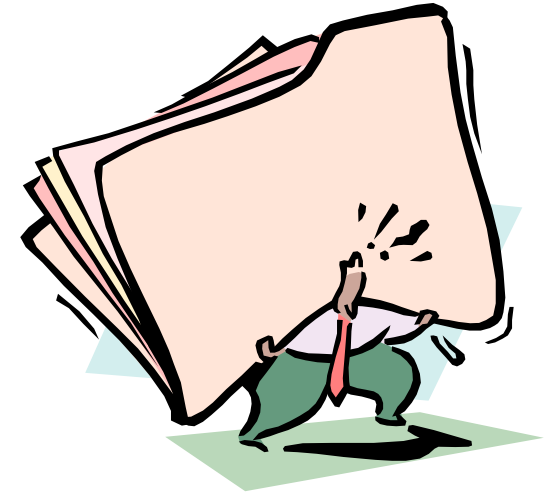
Legend:
- CAL
- CAP
- CFT
- DAQ
- FPD
- MUO
- SMT
- SAM
- EXP
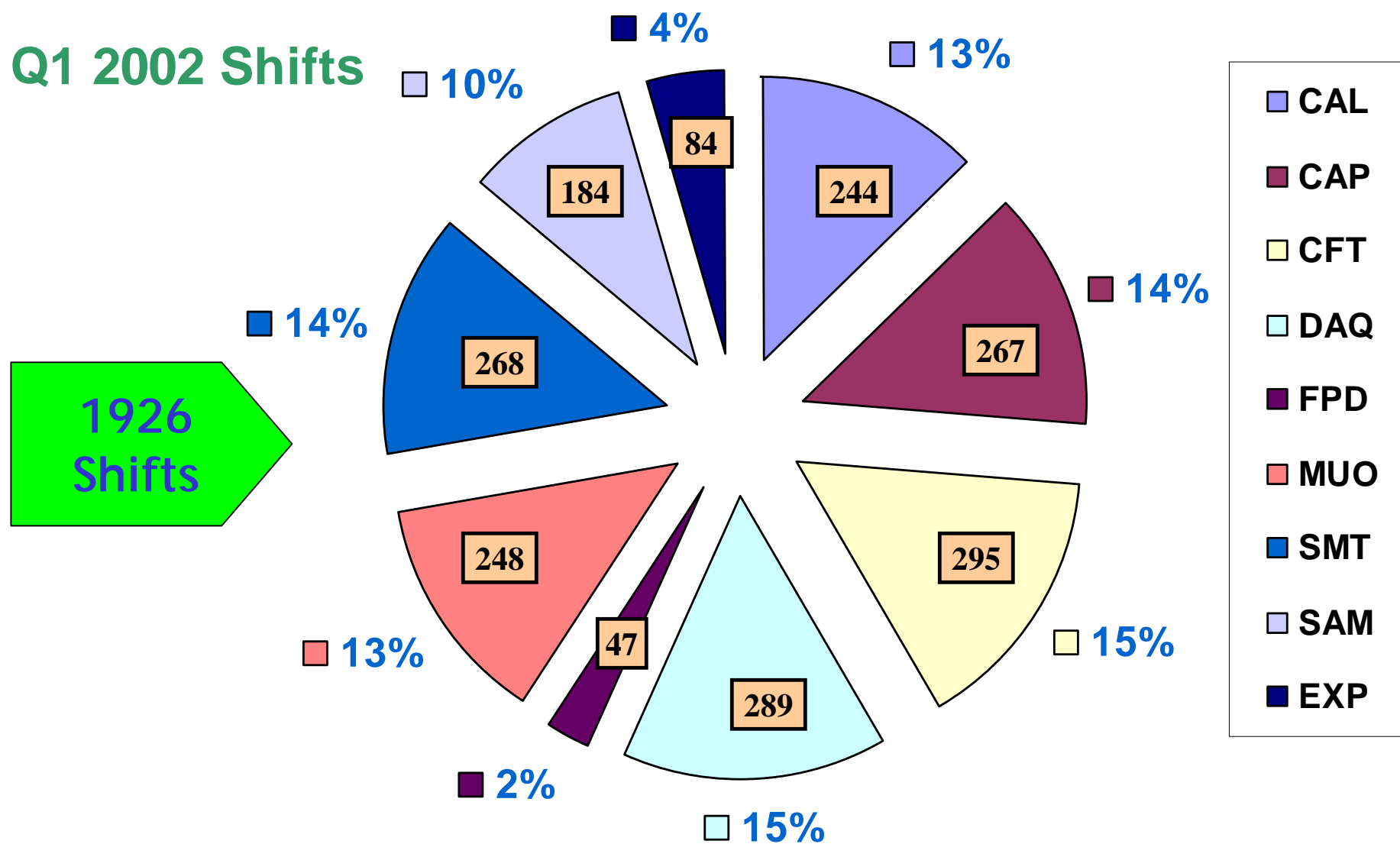
But…We Can Do Better!

- **1926 Shifts for Q1 2002 $\Rightarrow$ 65% Increase!**
  - Average of 1170/Q during 2001
  - First Quarter with fully staffed Control Room

- **Qtr. Shift Burden: 6.4, 7.5, 5.7, 7.1**
  - The increase of new shifters over the year has only met the need to fill new shift positions (CFT,SAM,Experts,etc.)

- **Over 250 DØ Members have yet to take a <u>Run 2</u> CR Shift**
  - This explains the gap between Shifter & Inst. effort
    - 14.8 Shifts/Shifter/year $\Leftrightarrow$ 9.3 Shifts/Inst Member/Year

- **Extrapolating from Q1 2002:**
  - We will need to fill about 7000 CR Shifts for next 12 months
    - Expect some cancelled shifts due to shutdown
    - May consolidate detectors shifts later in the year
  - 450+ Shifters required to maintain 15 Shifts/person/year

Apr 2001 - Mar 2002 Shift Average

9 Shifts

31 Inst

42 Inst

Shifts/Person/Masthead

40
35
30
25
20
15
10
5
0

Institution
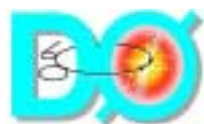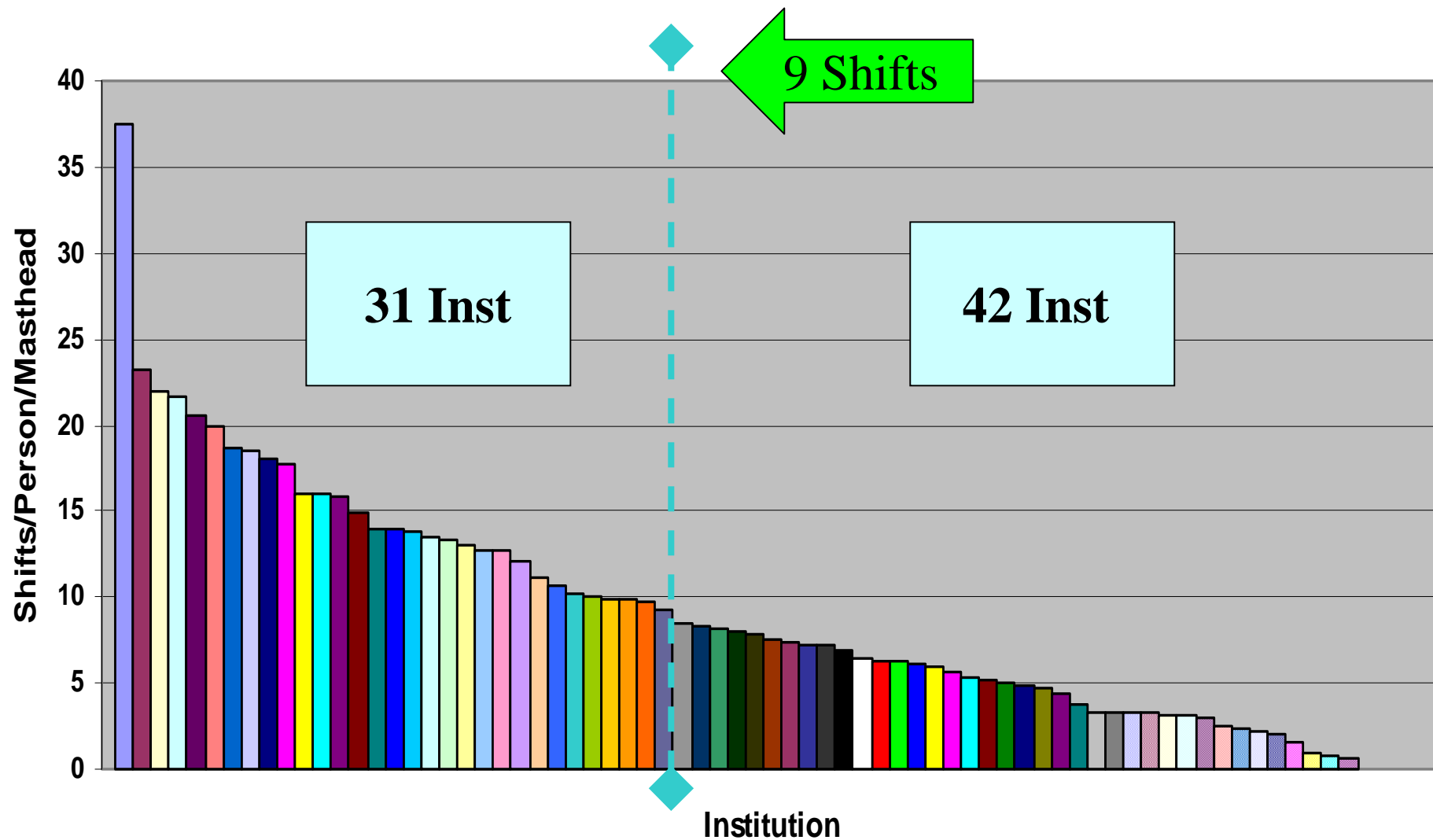
Conclusions: Shift Scheduling

- **Volunteer system is working well.**
  - Requests made to IB for shifters
    - Information send to Shift organizers
    - Who is resident (R) or non-resident (NR)
  - Still some issues with filling owl & weekend detector shifts
    - Best time to be on shift – for beam!
  - ➜ No change to DAQ Shifters – need 35 Shifters/year

    Still Need:
    Aug – 2; Sep – 3
    Oct – 4; Nov – 1
    Dec – 1
    - 6 Shifts/month, preferably for six months
- **Training & documentation vastly improved**
  - Average of 2 training shifts before going solo (3 for DAQ)
  - Shifter guides, meetings, web docs, user-friendly scripts & GUIs
- **Make NR shift requests at least 2-3 months in advance**
  - Best use of limited time (Class breaks, vacations, summer)
    - Possible to do many shifts in short period of time
  - Would require Shift Organizers to schedule 2-3 months in advance
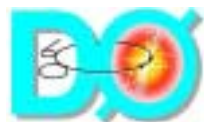   - DAQ & CAL already doing this

Conclusions: Shift Distribution

- **Uniform & increased counting of all Expert Shifts**
  - On-call experts critical to detector/system performance
    - Called at all hours & spend extra hours online or in CR
    - Keep current with system to stay effective
  - The current accounting penalizes institutions when a person graduates from Shifter to Expert

- **Modify Shift Formula to distribute 7000 Shifts among DØ Collaboration for next 12 months**
  - Resident (R) to Non-Resident (NR) population is about 1/3 to 2/3 *(based on Sept 2001 numbers)*
    - With 3:1 ratio – 21(7) Shifts/R(NR)/year
    - With 2:1 ratio – 18(9) Shifts/R(NR)/year
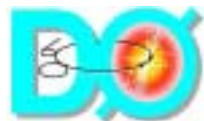   - Assumes 200 R & 400 NR

More efficient use of manpower & training

The Time to Volunteer for Summer Shifts Is Now!

Apr 2001 - Mar 2002 Shift Average

10 Shifts

22 Cons

30 Cons

Shifts/Person/Masthead

Consortium

Monthly Shifts

Yearly % Total Shifts

14.6%	CAL
18.6%	CAP
9.5%	CFT
21.1%	DAQ
1.1%	FPD
15.3%	MUO
12.2%	SMT
3.7%	SAM

Number of Shifts

120 100 80 60 40 20 0

A-01 M-01 J-01 J-01 A-01 S-01 O-01 N-01 D-01 J-02 F-02 M-02

Plus 3.8% Expert Shifts